11-2013

Simulating Health Policy Interventions to Reduce Nonmedical Use of Pharmaceutical Opioids

Alexandra E. Nielsen
Portland State University, alexan3@pdx.edu

Wayne W. Wakeland
Portland State University, wakeland@pdx.edu

Teresa Schmidt
Portland State University

Simulating Health Policy Interventions to Reduce Nonmedical Use of Pharmaceutical Opioids

APHA 2013, Boston, MA

Alexandra Nielsen, BS
Wayne Wakeland, PhD
Teresa Schmidt, MS

Portland State UNIVERSITY

Disclosures

The authors have no financial or nonfinancial relationships to disclose.

Principal Investigators:

- Wayne Wakeland, PhD
- Dennis McCarty, PhD

Research Associates:

- Alexandra Nielsen, BS
- Teresa Schmidt, MS, MA

Research Assistants:

- Amanuel Zimam, MBA
- Christan Blystone, MS

Funding: NIDA grant R21DA031361

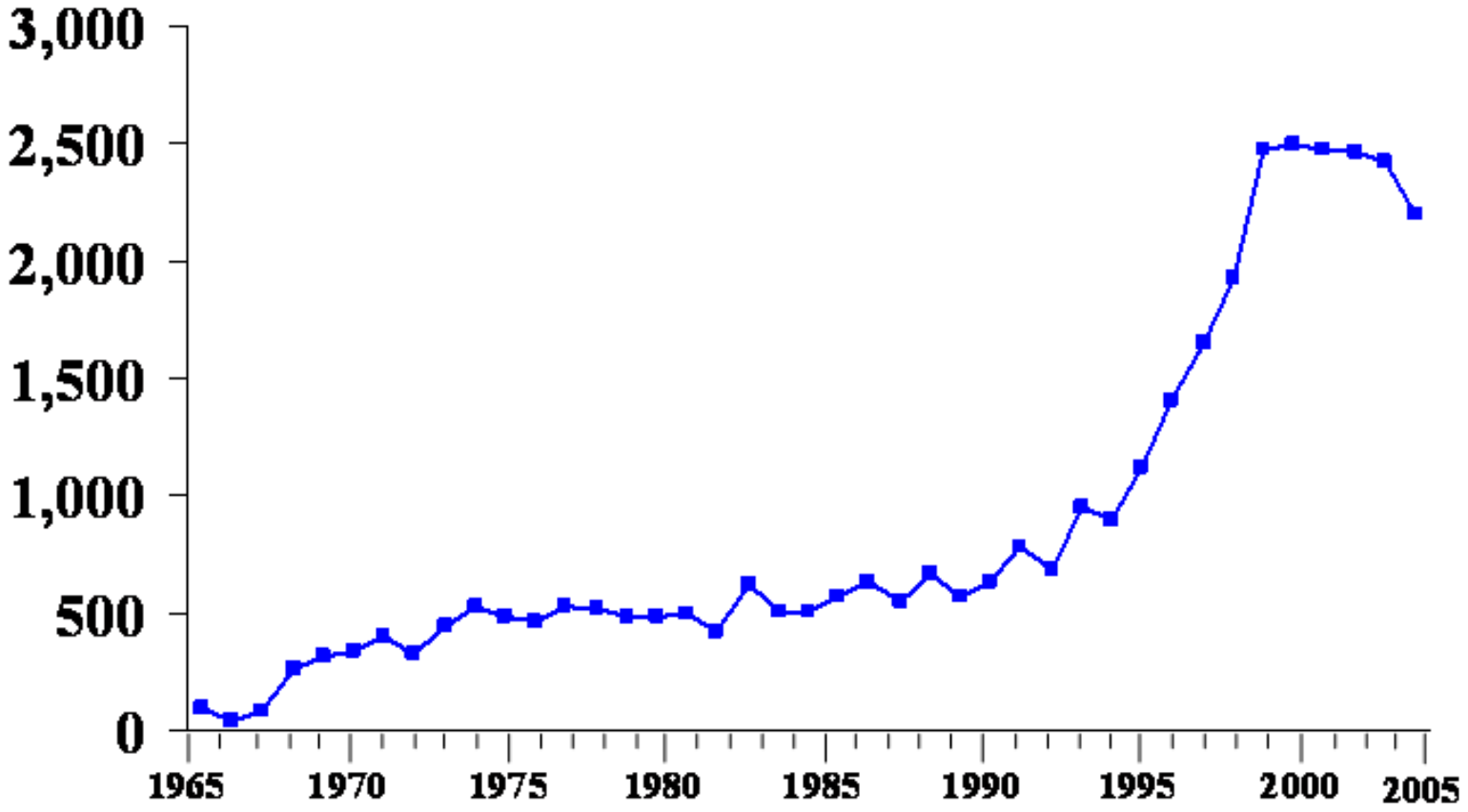
Expert panel members:

- Lynn Webster, MD
- Aaron Gilson, PhD
- Neal Wallace, PhD

Overview

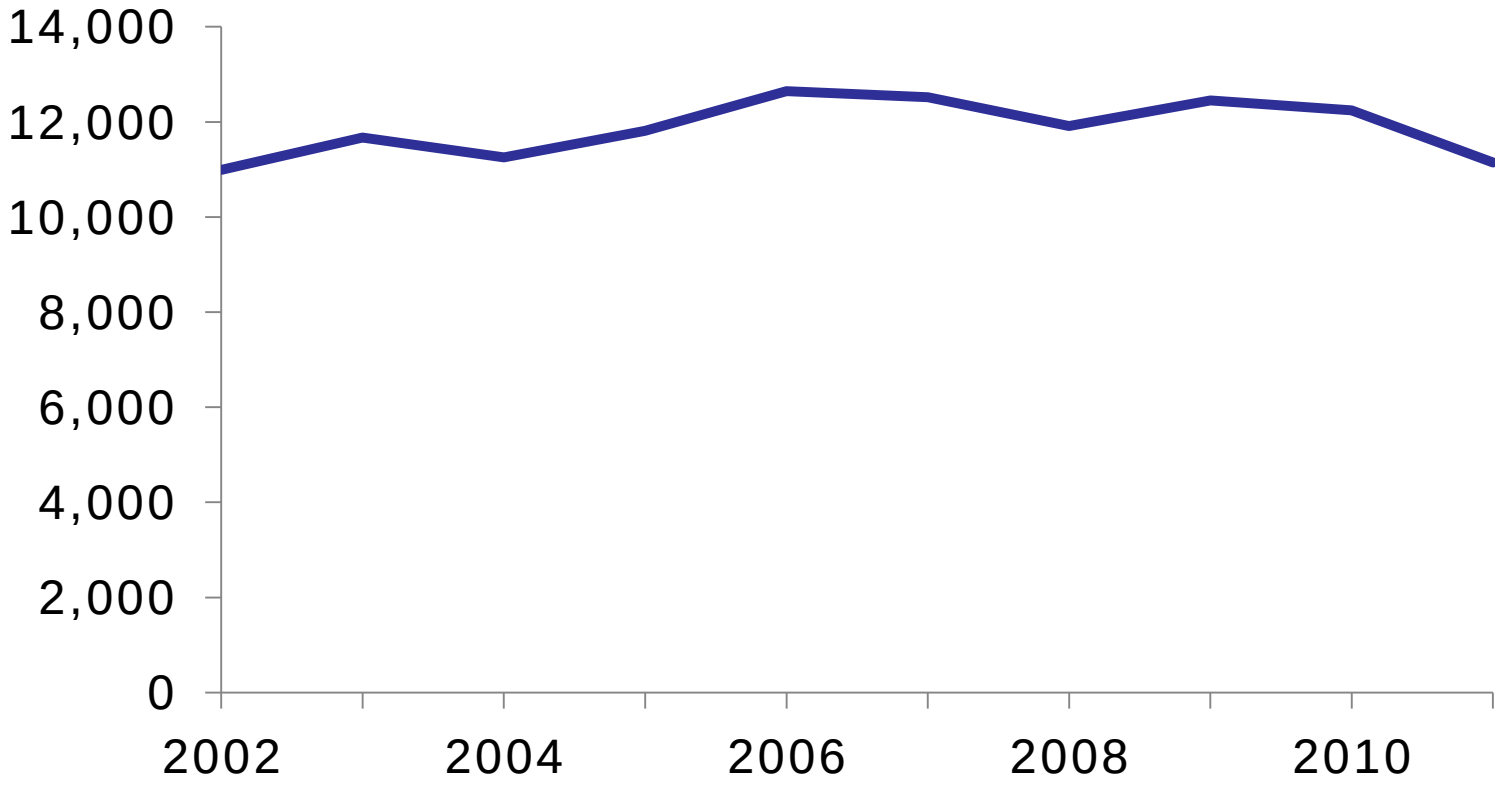
- Background
- Model Overview
- Prediction Tests
- Policy Analysis
- Limitations
- Future Research

Epidemic: year of first opioid use



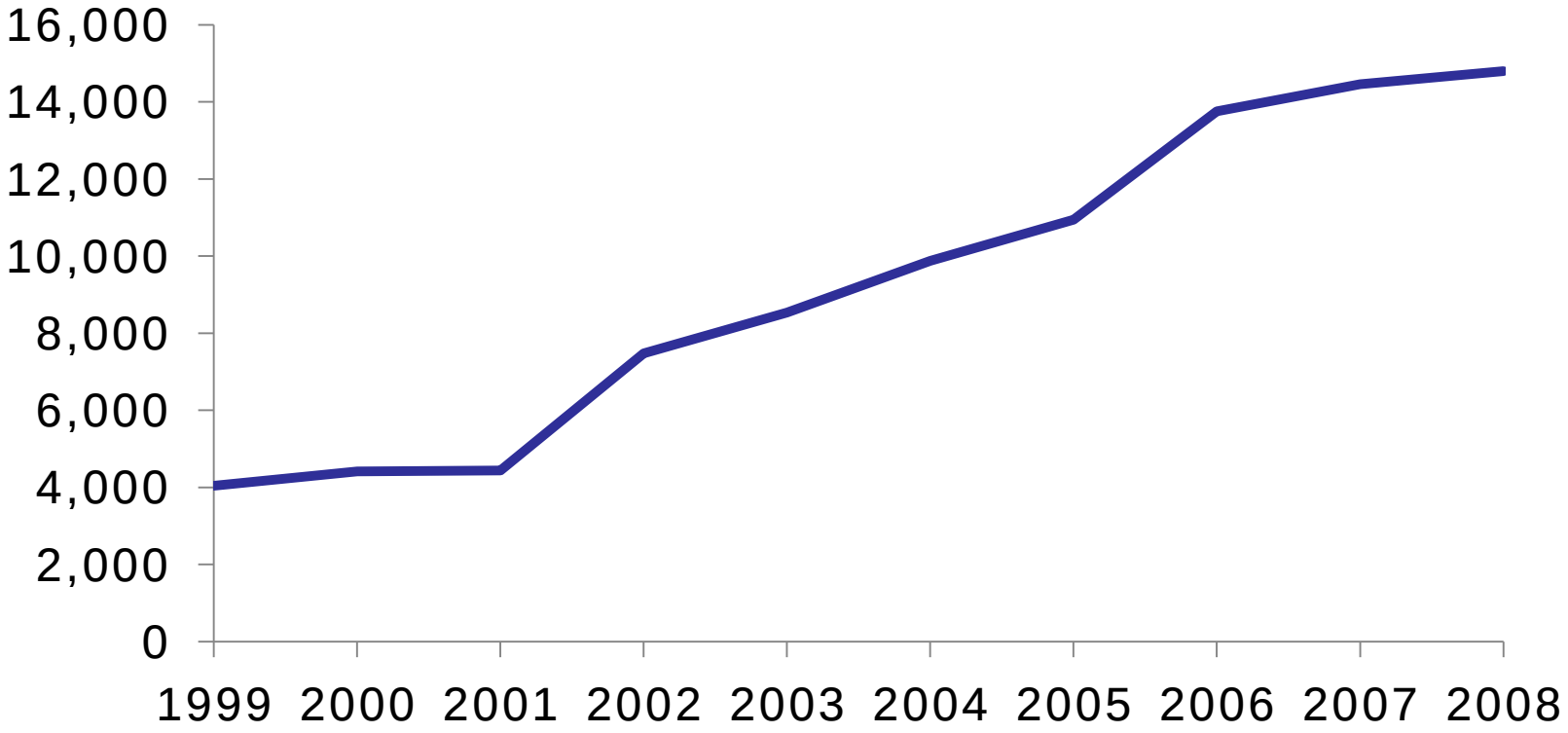
Source: SAMHSA (2006). Overview of findings from the 2005 National Survey on Drug Use and Health. (Office of Applied Studies, NSDUH Series H-30, DHSS Publication No. SMA 06-4194). Rockville, MD.

Endemic: past year nonmedical opioid use



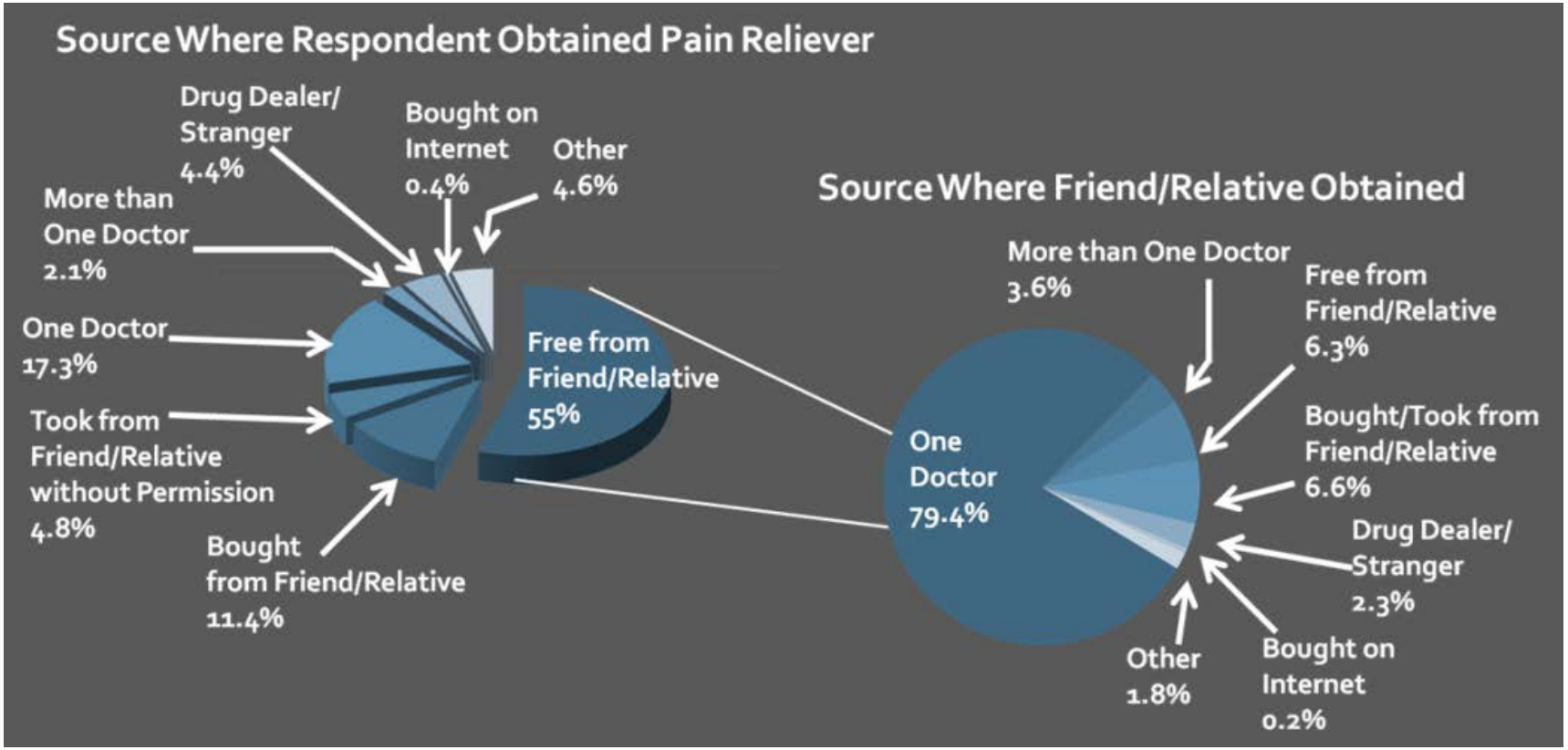
Source: Substance Abuse and Mental Health Services Administration, *Results from the 2011 National Survey on Drug Use and Health: Detailed Tables*.

Poisoning deaths involving opioids



National Center for Injury Prevention and Control, “CDC Vitalsigns - Prescription Painkiller Overdoses in the US - 2011-11-vitalsigns.pdf.”

Sources: interpersonal sharing



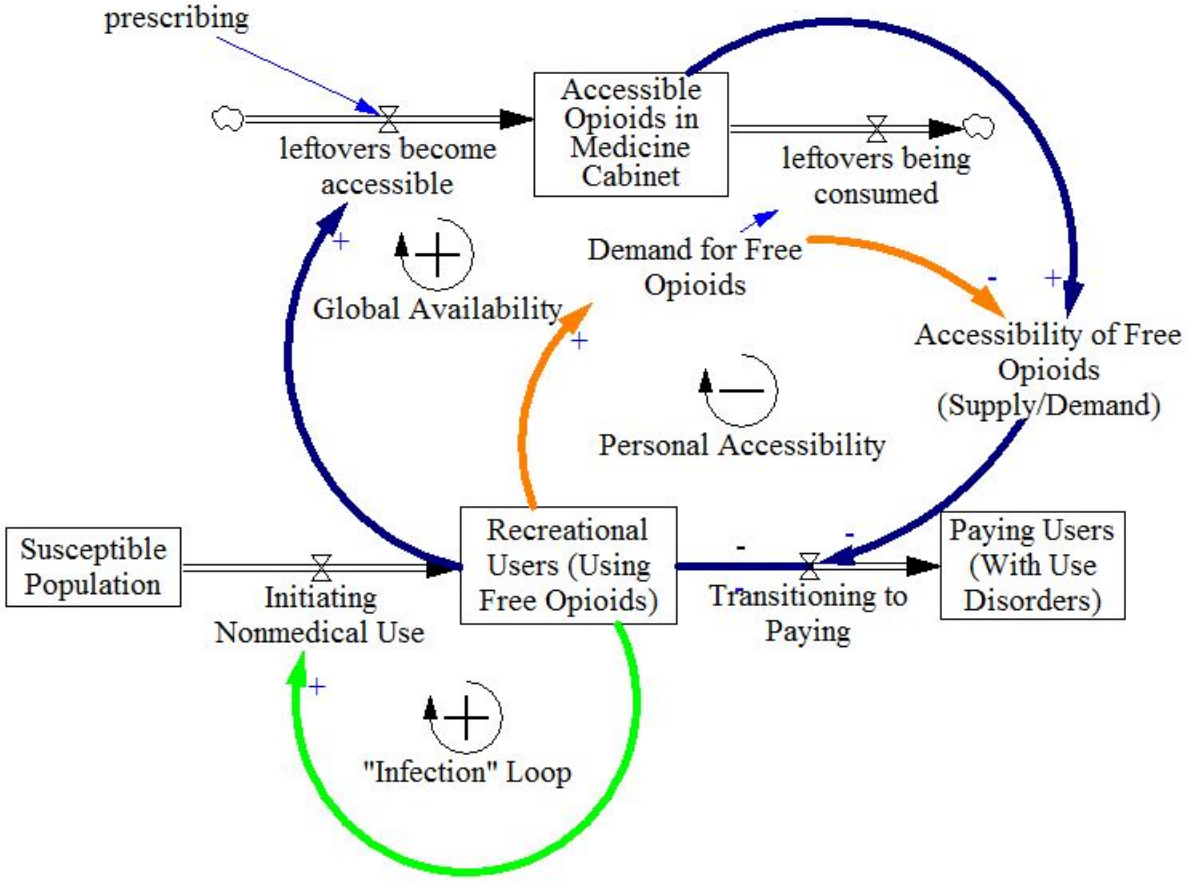
Source: Substance Abuse and Mental Health Services Administration, *Results from the 2011 National Survey on Drug Use and Health: National Findings*.

The medicine cabinet

- Take Back Day in Madison, WI
  - 100,000 opioid dosage units recovered
- Study of post-surgical patients
  - 67% have leftover opioids
  - 91% keep those in the home

Sources: Gilson, Aaron (2012). Personal Communication
Bates, C., Laciak, R., Southwick, A., & Bishoff, J. (2011). Overprescription of postoperative narcotics: a look at postoperative pain medication delivery, consumption and disposal in urological practice. *The Journal of urology*, *185*(2), 551–555.

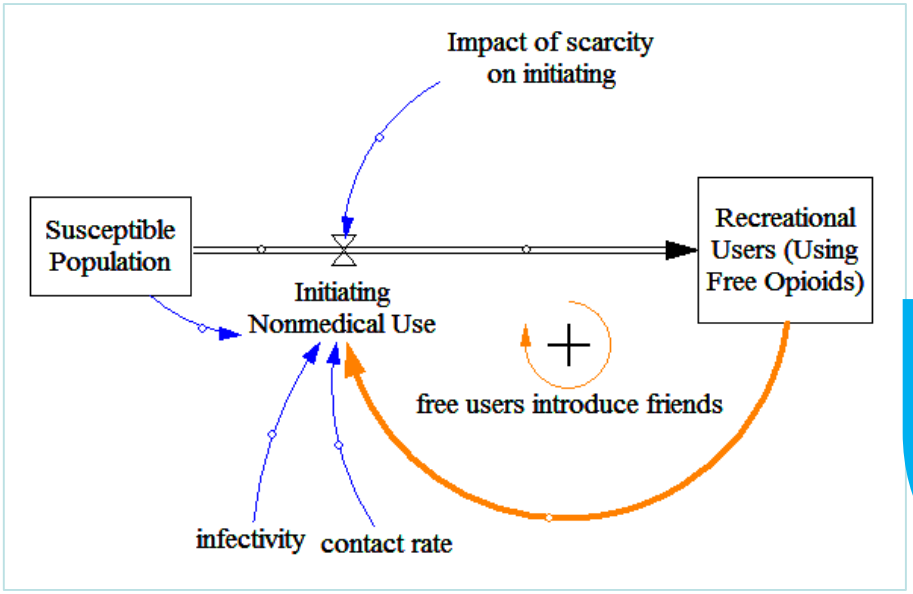
Model Overview: Diagram of the System

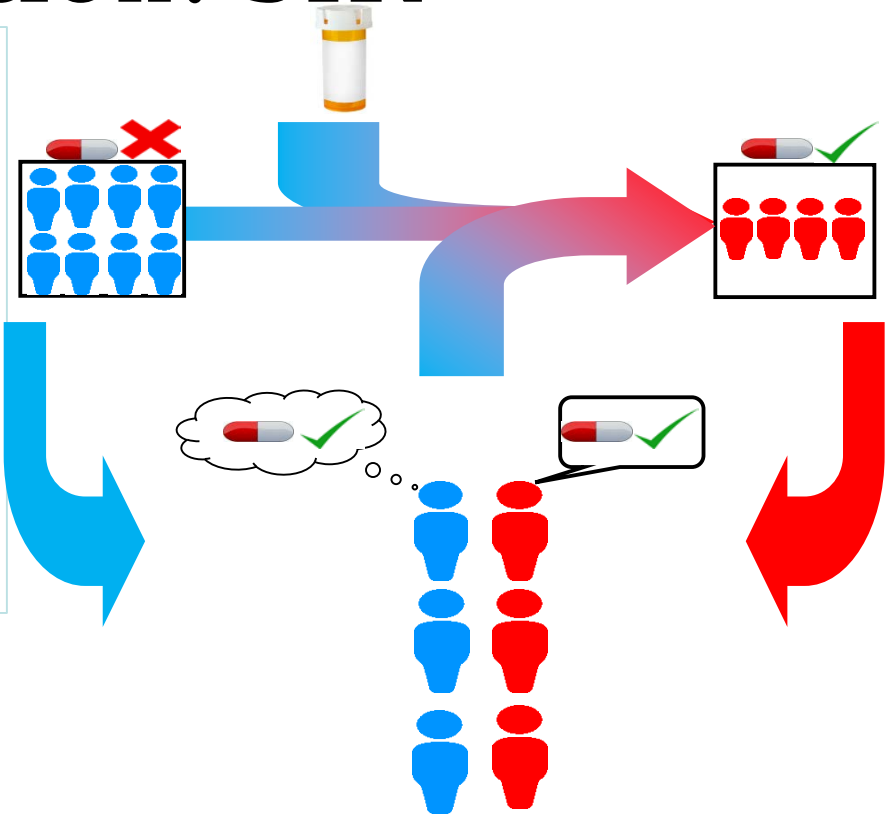


Why a Systems Model?

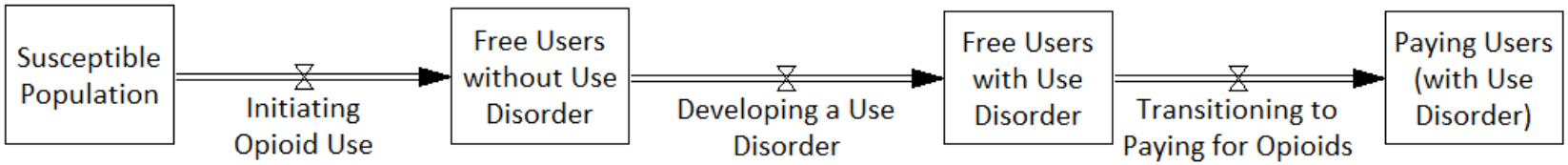
- Course grained view of broad trends
- Qualitative stories powered by math specified by data
- Integrate data from multiple sources
- Identify missing data, areas for inquiry
- Find high leverage intervention points
- Anticipate and explore downstream effects (main and “side”)
- Encourage communication

Initiation as infection: SIR

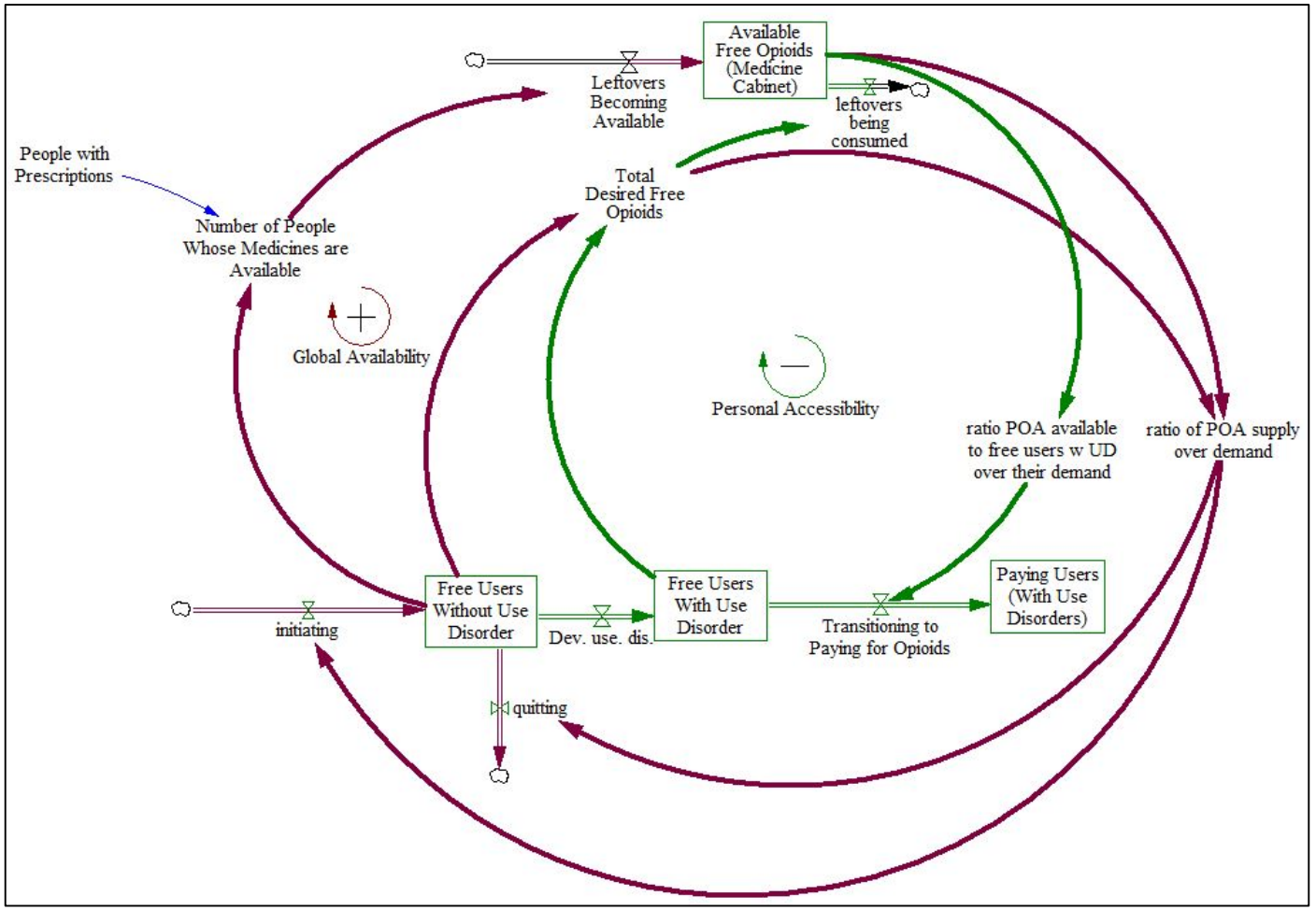




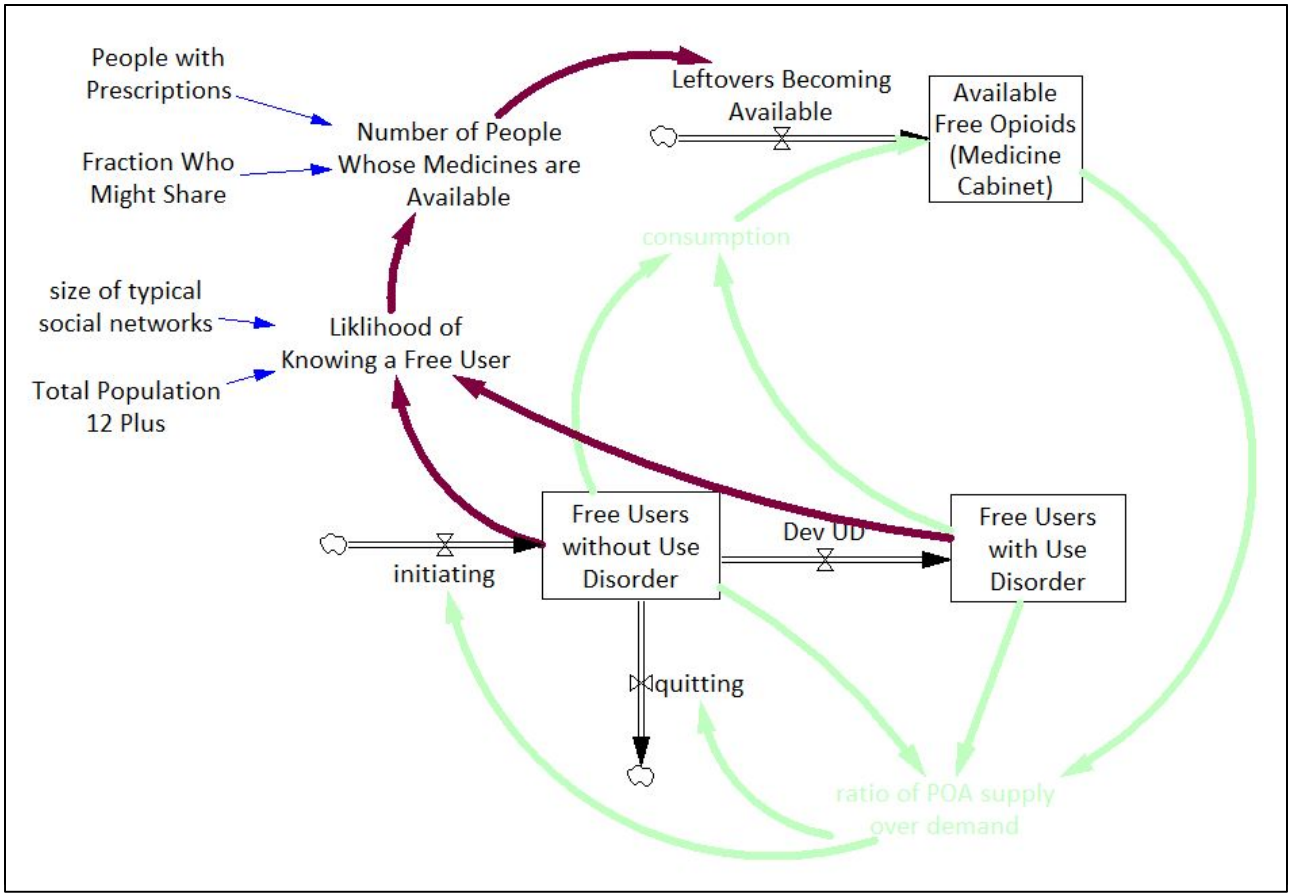
Progression of Opioid Use



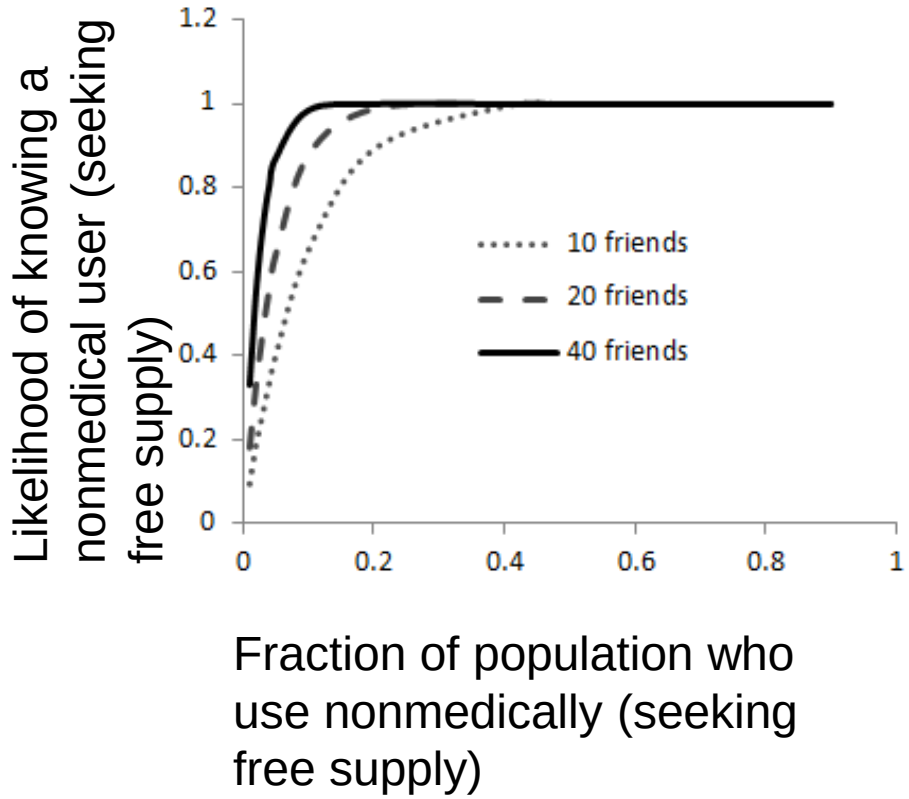
Supply and Demand Dynamics



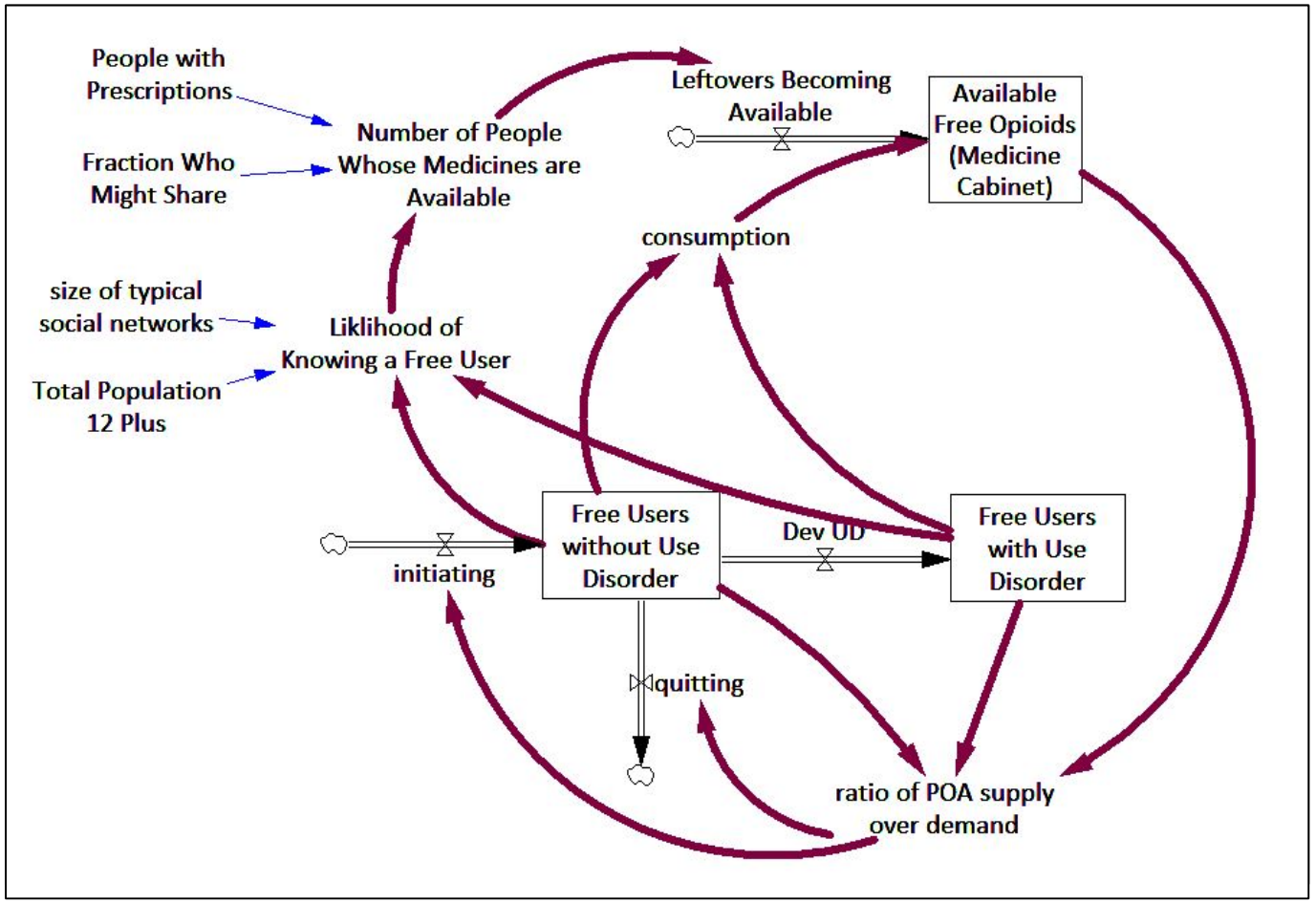
Free users open up supply



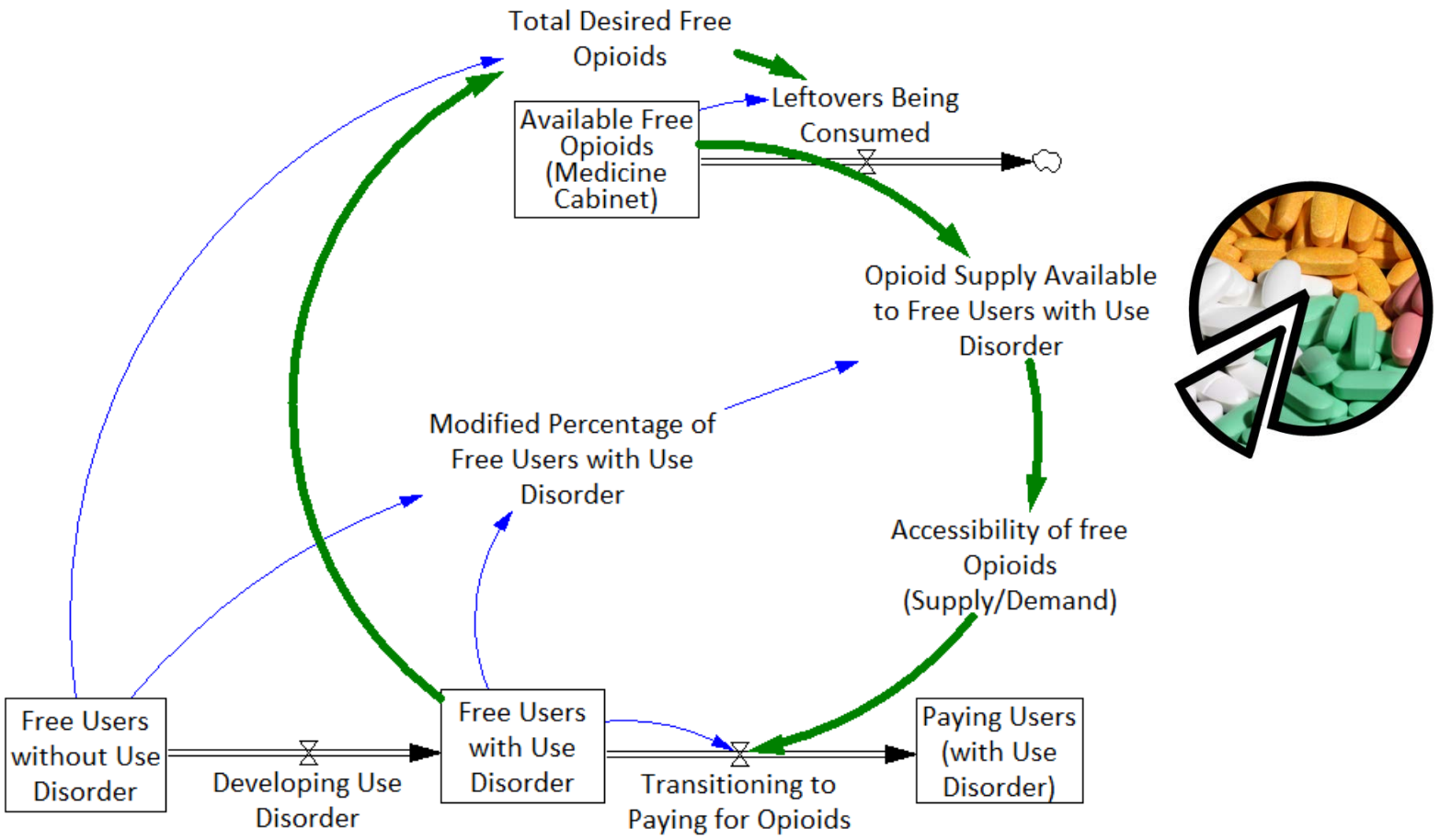
Likelihood of knowing AT LEAST one



Global Supply and Demand



Heavy users deplete local supply



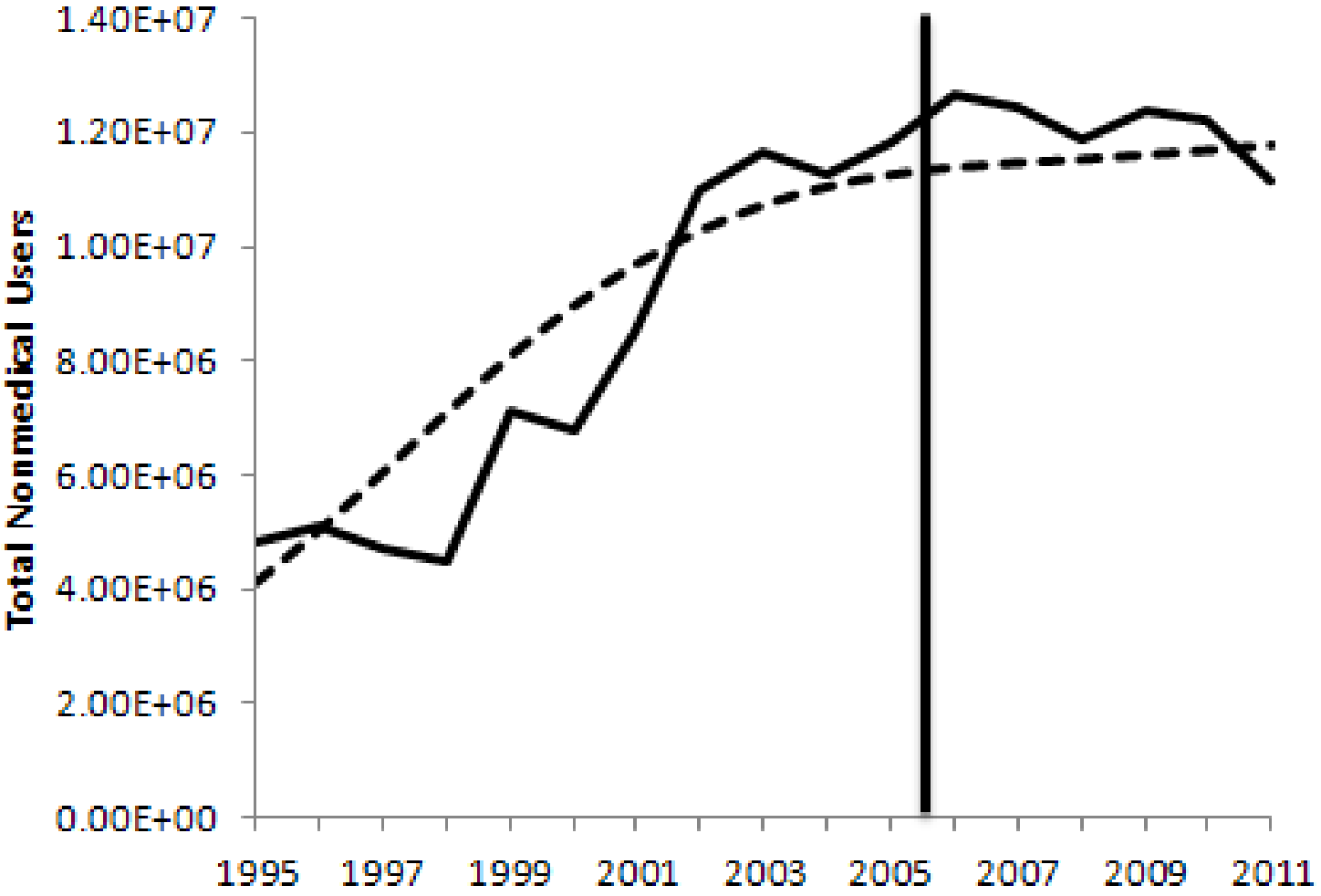
Key Parameter Values

Parameters	Support
People receiving opioids for acute pain	SDI Health for 2002, 2006, 2010. Extrapolated using Governale 2008.
Medication leftovers	Tufts Health Care Institute Program on Opioid Risk Management 2010
Doses per nonmedical use event	Katz, Birnbaum, & Castor 2010
Number of days nonmedical use	NSDUH 1995-2012
Fraction of youth perceiving little risk in opioid use	Monitoring the Future, Johnson 2013
Incidence and prevalence quitting rates	NSDUH 1995-2012

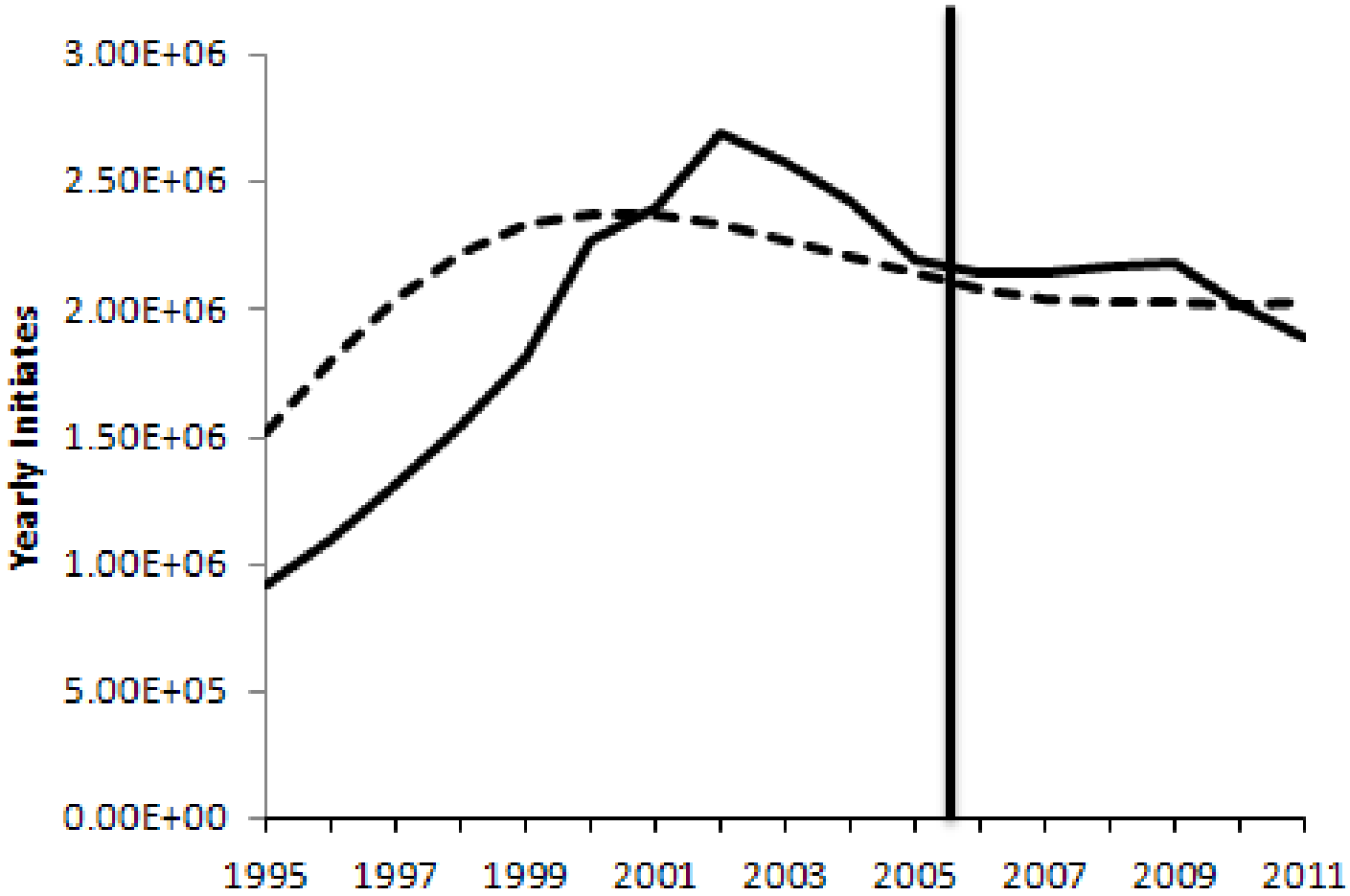
Model testing

- Proof of concept, exploratory model
- Calibrated to fit 3 time series 1995-2005
- Predicted 2006-2011

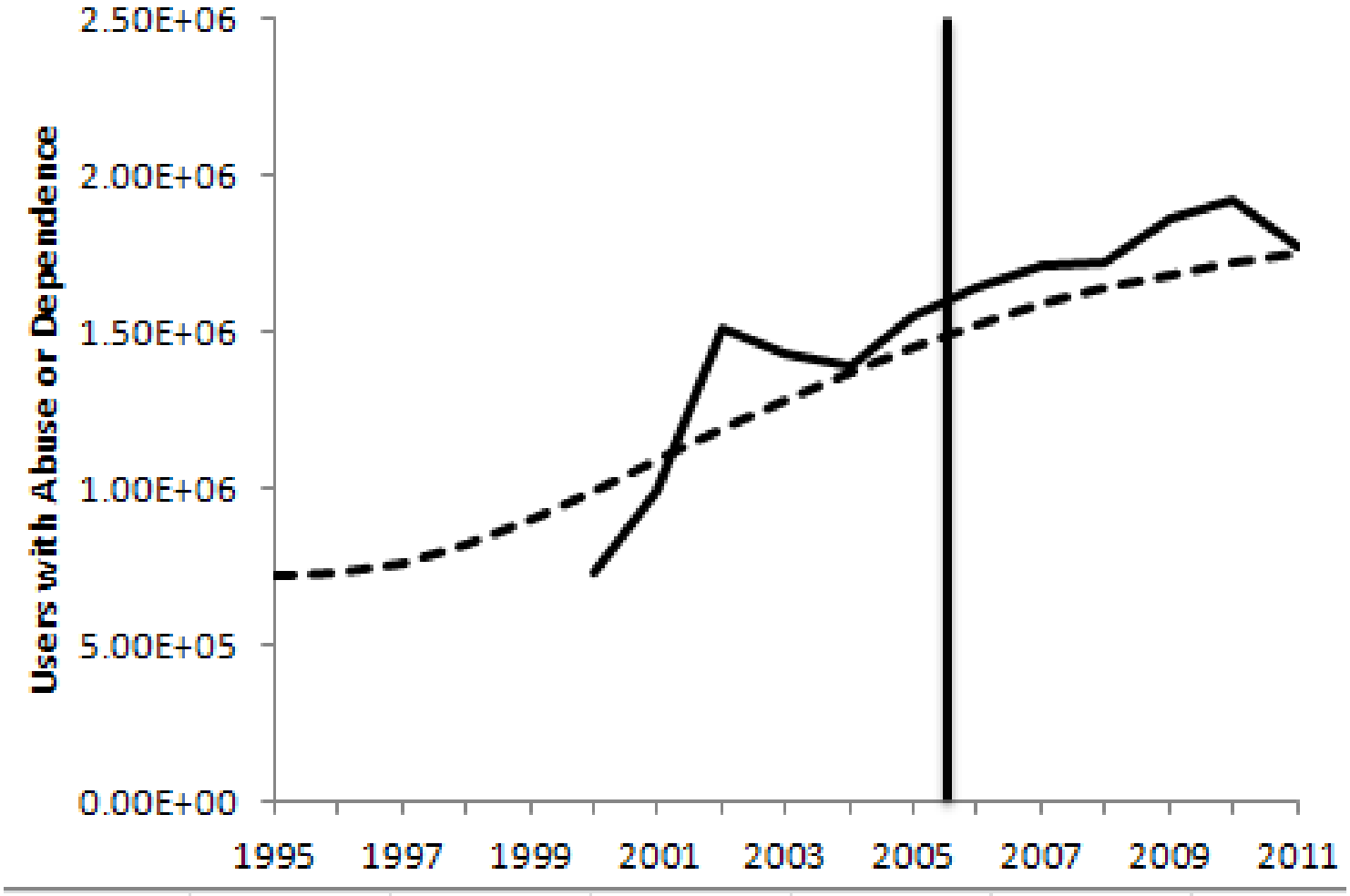
Model vs RBP: Nonmedical Users



Model vs RBP: Initiates



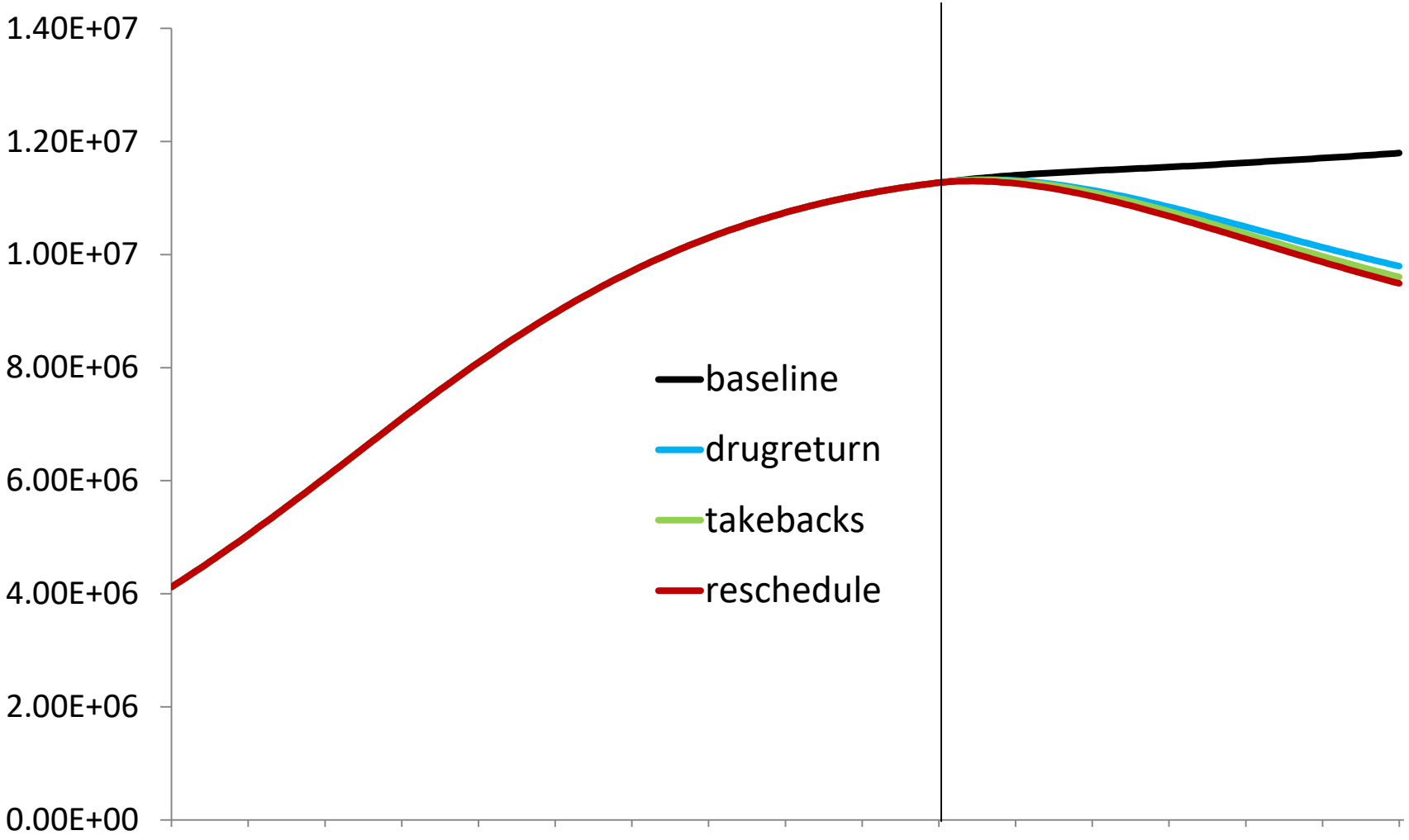
Model vs RBP: Users with Use Disorder



Policy Strategies: Supply Side

- Parametric change in 2005
- **Drug return:** 25% Consumers return leftovers to pharmacy
- **Take Back Days:** 100,000,000 dosage units per year (50 cities, twice a year, 100,000 DU/day)
- **Hydrocodone reschedule:** 25% reduction in people receiving opioids for acute pain

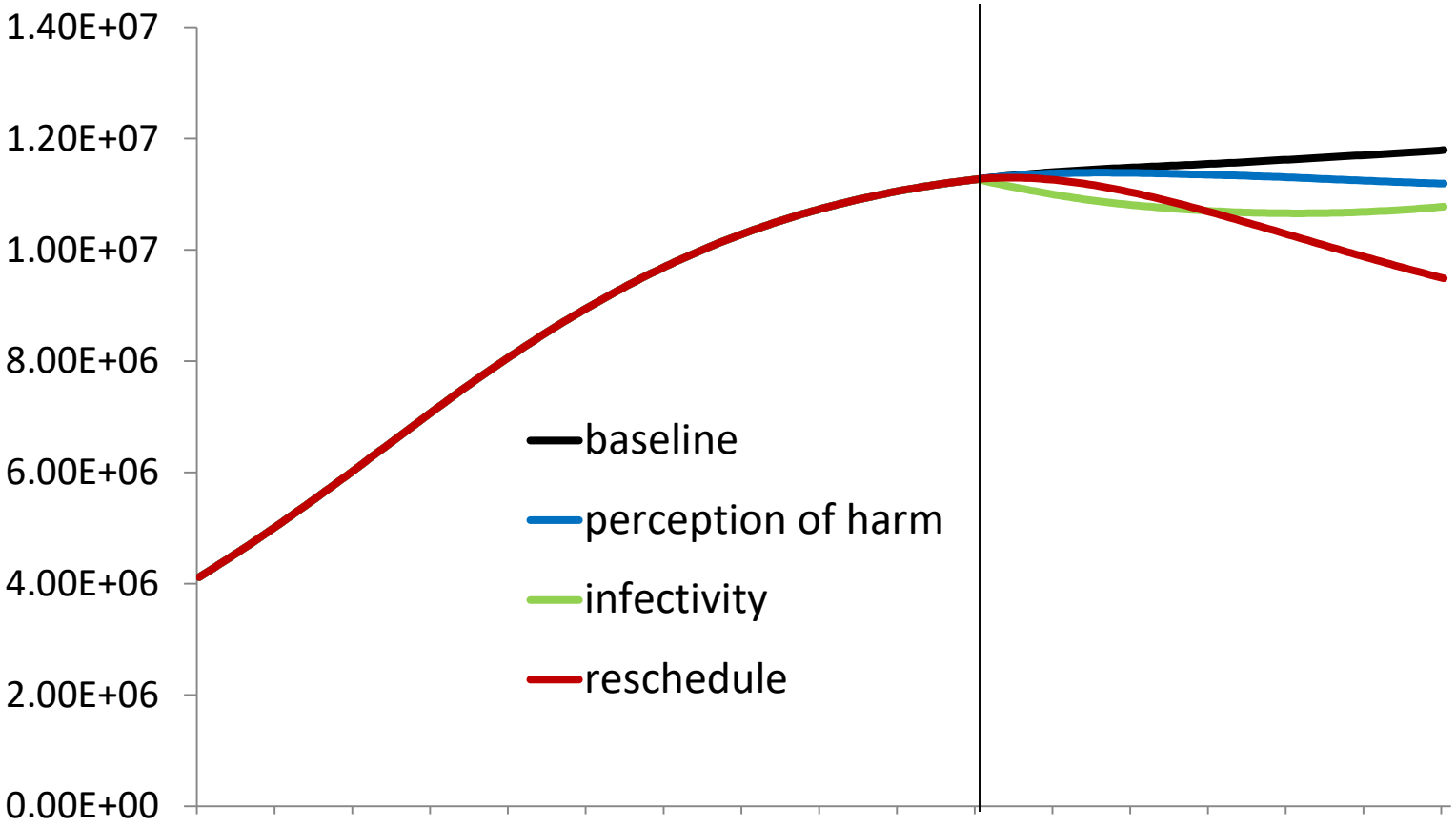
Results: Supply Side Strategies



Policy Strategies: Demand Side

- Parametric change in 2005
- **Infectivity:** 25% reduction "infectivity" of opioid use idea
- **Perception of Harm:** 25% reduction in number of youth who see little risk in opioids
- **Reschedule:** (quasi-demand side) fewer people exposed to opioids through their own prescriptions.

Results: Demand Side



Policy Analysis Discussion

- Surprised by leverage of supply side strategies
  - Limiting supply reduced number of casual users,
  - But pushed addicts riskier supply sources
- Limiting access NOT better than reducing leftovers
  - Side effect—undertreated/untreated pain
- Demand reduction message overwhelmed by available drugs

Limitations

- Needs stronger empirical support
- Complex-needs to be simplified
- Limited data for robust validation
- Household survey data misses hidden populations

Future Research

- Add outcomes
- Strengthen face validity reaching out to population of concern
- Investigate balloon effects (transition to heroin)
- Interventions with structure, not just parameter adjustment
- Investigate comparative effectiveness/cost effectiveness

Want the full model? Questions?

Contact: Alex Nielsen,
alexan3@pdx.edu

Or: Wayne Wakeland,
wakeland@pdx.edu